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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/517,680	03/02/2000	Mark A. Burns	UM-04241	5024

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EXAMINER

LUDLOW, JAN M

ART UNIT	PAPER NUMBER
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1743

DATE MAILED: 05/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/517,680

Applicant(s)

BURNS ET AL

Examiner

Jan M. Ludlow

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 1743

1. This application, filed under former 37 CFR 1.60, lacks formal drawings. The informal drawings filed in this application are acceptable for examination purposes. When the application is allowed, applicant will be required to submit new formal drawings. In unusual circumstances, the formal drawings from the abandoned parent application may be transferred by the grant of a petition under 37 CFR 1.182.

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The description of anisotropic expansion of a meltable material inducing movement of the meltable material from one channel to another to restrict flow in claim 18 does not appear in the disclosure as filed.

3. Claims 18-21 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no teaching in the specification of heating a meltable material so as to produce anisotropic expansion of the material to induce movement of the material from one channel to another to restrict flow.

4. This application repeats a substantial portion of prior Application No. 08/888,309, filed July 3, 1997, and adds and claims additional disclosure not presented in the prior application. Since this application names an inventor or inventors named in the prior application, it may constitute a continuation-in-part of the prior application. Should applicant desire to obtain the benefit of the filing date of the prior application, attention is directed to 35 U.S.C. 120 and 37 CFR 1.78.

Art Unit: 1743

5. Claims 18-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 18 is unclear because it is unclear how the method steps relate to the preamble, i.e., how the heating and other steps restrict flow. It is further not clear whether the meltable material melts upon heating, whether it expands and moves as a solid or liquid. Note that a liquid is not really "meltable" since it has already melted, so "movement of said meltable material" appears to indicate that a solid is moving, which is not supported by the disclosure.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

8. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

10. Determining the scope and contents of the prior art.
11. Ascertaining the differences between the prior art and the claims at issue.
12. Resolving the level of ordinary skill in the pertinent art.
13. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

Art Unit: 1743

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103 and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

15. Claims 1-3, 10-13, 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ebersole.

16. Ebersole teaches a device and method for restricting flow from one layer of a test device to another layer via a barrier layer. The barrier layer, which may be made of glass (col. 5, line 40) has pores (the instant microchannels) impregnated with a polymer material (col. 6, line 32) that melts upon application of heat to permit flow through the pores (e.g., col. 3, lines 35-59; col. 5). The test piece may be placed on a constant temperature surface for heating and the melted polymer may be retained in the pores of the barrier layer (col. 7, lines 10-20).

17. Ebersole fails to explicitly teach a heating element associated with the meltable material in the substrate.

18. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a heating element in the constant temperature surface on which the test element is placed for heating in order to raise and maintain the constant temperature surface above ambient temperature. With respect to claim 18, in that the teachings of Ebersole encompass randomly oriented pores, melting of the polymer in the microchannels of the substrate to open some pores while maintaining the polymer in the substrate inherently encompasses the passage of the melted polymer from a pore (channel) in one orientation to a pore in a substantially perpendicular orientation under the force of capillarity and/or gravity.

Art Unit: 1743

With respect to anisotropic expansion, to the extent the term is understood, those portions of the meltable substance closest to the heater will be warmed first and therefore expand first, while the portions farthest from the heater remain solid and/or expand later.

19. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kremer.

20. Kremer teaches a valve having a diaphragm 26 in contact with meltable material 32.

While the gas cylinder is empty, it is heated to evaporate water prior to filling with high-purity gas (col. 1, lines 50-65). In the invention of Kremer, an o-ring seal 30 is provided to contain the meltable material during heating for evaporation col. 2-3). The cylinder is then cooled and filled. Once filled, if the cylinder is exposed to heat that generates excessive pressure, the meltable material melts and the diaphragm is moved by cylinder pressure to pressurize the meltable material which escapes via the elastic o-ring (col. 3).

21. Kremer fails to explicitly teach a heating element associated with the meltable material in the valve.

22. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a heating element in association with the cylinder and valve to heat the cylinder with the valve in place in order to dry the cylinder as taught by Kremer. With respect to materials of construction, it would have been obvious to use glass in the valve channel for its known inert properties, e.g., as a glass-lined fixture. With respect to the meltable material, it would have been obvious to use meltable material having a melting point at the desired pressure relief conditions. With respect to microdroplet channels, it would have been obvious to scale the dimensions of the valve of Kremer in order to produce a pressure relief microvalve. With respect to claim 26, the side channel is shown as horizontal in figure 2 of Kremer and the main

Art Unit: 1743

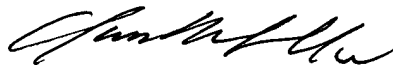
channel is the annular space holding the o-ring. With respect to anisotropic expansion, to the extent the term is understood, those portions of the meltable substance closest to the heater will be warmed first and therefore expand first, while the portions farthest from the heater remain solid and/or expand later.

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Culp teaches anisotropic expansion of a crystal in an actuator (col. 15, lines 25-30).

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jan M. Ludlow whose telephone number is (703) 308-4039. The examiner can normally be reached on Monday-Thursday, 11:30 am - 8:00 pm.

25. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (703) 308-4037. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

26. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Jan M. Ludlow
Primary Examiner
Art Unit 1743

jml
March 19, 2003